

NOTES ON FISHES FROM THE ISLAND OF SANTA CATALINA. SOUTHERN CALIFORNIA.

By DAVID STARR JORDAN and EDWIN CHAPIN STARKS.

Of Stanford University, California.

The senior author visited the bay of Avalon on the island of Santa Catalina off the shore of southern California in May, 1906. While there he made a small collection of fishes, chiefly through the kindly interest of Dr. Charles Frederick Holder, of Pasadena, California.

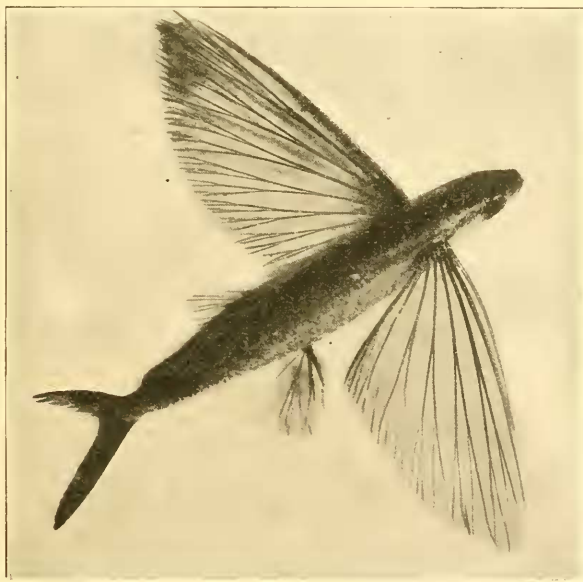


FIG. 1.—*CYPSILURUS CALIFORNICUS* (ADULT).

who was with him at the time, and of Miss Frances Lauderbach, an artist, then resident at Avalon. The accompanying drawings are by Mr. W. S. Atkinson and the photographs by Mr. Charles Ironmonger, of Avalon.

Several rare species were obtained, most of them being fishes which had died at the local aquarium, and had been turned over to Doctor Holder, or to Miss Lauderbach.

Family EXOCETIDÆ.

CYPsilURUS CALIFORNICUS (Cooper).

A flying-fish, 3 inches in length, collected at Avalon by Doctor Holder, is apparently the young of the large Catalina flying-fish. It differs from the adult in color. The greater part of the body is colorless, translucent in life, and covered with fine points of brown, which forms large irregular blotches opposite the dorsal fin. Pectoral dark brown, with transparent blotches; a round one near base of upper

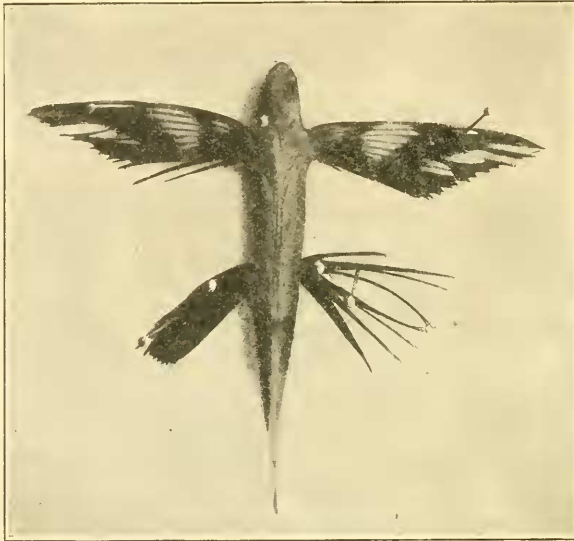


FIG. 2.—CYPsilURUS CALIFORNICUS (YOUNG).

pectoral rays; another somewhat triangular in shape at middle of fin nearly crossing the entire fin; the last an irregular streak near ends of rays following the posterior outline of the fin; ventrals bluish black, darker than other fins; dorsal slightly dusky; a light inconspicuous blotch near front of fin; anal dusky brown, the first one or two rays colorless; caudal colorless, except the faintest trace of two dusky spots on lower lobe; one near middle of rays, the other near tips of rays.

Family POLYNEMIDÆ.

POLYDACTYLUS APPROXIMANS (Lay and Bennett).

(*Polymenus californiensis* Thominot.)

This species, common about Mazatlan, has been once taken at Santa Catalina and once at San Diego.

Family LAMPRIDÆ.

LAMPRIS REGIA (Bonnaterre).

The opah is occasionally taken about Santa Catalina; two stuffed specimens were seen.

Family SCOMBRIDÆ.

GERMO MACROPTERUS (Schlegel).

The yellow fin albacore, Hirenaga of the Japanese fishermen, has been in the past two years occasionally taken off Avalon. It is a common fish of southern Japan, and is occasionally taken about Hawaii. From the ordinary albacore, *Germo alalonga*, abundant about Santa Catalina, this species is known by the citron yellow finlets and by the very high soft dorsal and anal.

In the Hawaiian report of Jordan and Evermann this species, known in Hawaii as Ahii, is described, under the incorrect name of *Germo*

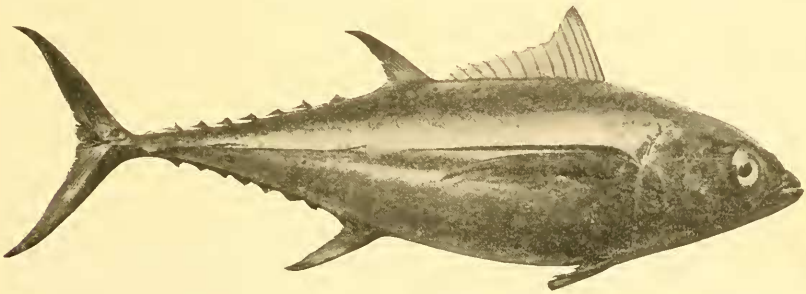


FIG. 3.—GERMO MACROPTERUS.

germo, which name belongs to a near relative of the common Albacore. The figure, copied by Jordan and Evermann from Schlegel's figure of "*Thynnus sibi*," belongs to *Germo germo*, of which *Germo sibi* is apparently a synonym.

The following description of *Germo macropterus* is taken from a Hawaiian example:

Head $3\frac{3}{5}$ in length to base of caudal; depth $3\frac{3}{4}$; eye $5\frac{1}{2}$ in head; snout 3; maxillary $2\frac{1}{2}$; DXIV—II, 12+VIII. A II, 12+VI.

Body stout, fusiform; dorsal and ventral curves gradual, the body deepest at the middle. Head sharply conic; snout pointed; jaws subequal; maxillary reaching to opposite middle of pupil; teeth in jaws in one row; small, bluntly conic; a patch of villiform teeth on vomer, none on palatines. Eye large; caudal peduncle at narrowest point half depth of eye. First dorsal spine $2\frac{1}{2}$ in head; soft dorsal and anal similar, elevated, falcate, the longest ray 3 in head; pectoral long and slender, as long as head, reaching front of anal; caudal lobes each $1\frac{3}{10}$ in head, ventrals $2\frac{7}{10}$. Scales small, those on shoulder forming a distinct corselet. Color in life dark blue with steely reflections, silvery below; traces of very faint pale bands separated by rows of very faint spots curved backward below on lower part of body; soft dorsal and anal yellow, the finlets bright lemon yellow; caudal dusky white, with yellow border; ventrals white on lower surface, black above, with a

small black spot on base; pectoral very dark blue, above, black on inner surface, silvery grayish blue on outer surface.

This species has been occasionally taken on the hook in the last two years about Avalon. It was first noticed as a California fish by Doctor Holder.

GYMNOSARDA PELAMIS (Linnæus).

This species, the "Oceanic Bonito," is frequently taken about Santa Catalina and San Diego. It is common in Hawaii and Japan.

Family LEPIDOPIDÆ.

LEPIDOPUS XANTUSI Goode and Bean.

One specimen, $2\frac{1}{2}$ feet long, from Avalon.

Head $4\frac{1}{2}$ in length. Depth at front of dorsal $2\frac{2}{5}$ in head; eye $5\frac{2}{3}$; snout $2\frac{9}{10}$; maxillary $2\frac{5}{6}$; dorsal rays 80; anal I, 46.

Body long and slender, tapering to a very narrow caudal peduncle. Head deeper than the body. Upper profile of head nearly straight from front of dorsal to premaxillary processes, where the outline is

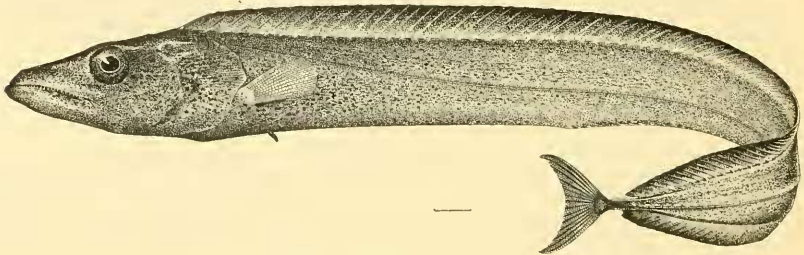


FIG. 4.—*LEPIDOPUS XANTUSI*.

angulated and descends obliquely; supraorbital rim slightly prominent. Gape rather strongly curved; lower jaw projecting and hooked upward at its tip. A single row of sharp flattened teeth at edge of jaws, growing smaller anteriorly; near front of upper jaw are two pairs of long sharp dagger-shaped canines, a little inside of the smaller lateral teeth. Maxillary extending nearly to front of pupil; its posterior part almost entirely concealed by the preorbital. Interorbital space concave at its middle portion; the outer edges nearly flat; its width three-fifths of diameter of orbit. Skin of side of head continuous over preopercle. Gillrakers slender, stiff, and needle-like; the length of the longest a little less than that of the canines, their number 9+11; some of them interspaced by much smaller ones (not included in the above count).

Origin of dorsal from tip of snout equal to distance from tip of mandible to edge of preopercle; longest dorsal rays inserted about the head's length behind head, contained five times in head. Anterior anal rays covered by the skin, the posterior rays shorter than the dor-

sal rays above them: the last anal ray connected to caudal peduncle by membrane. On a small specimen, $5\frac{1}{2}$ inches long, collected at San Jose del Cabo, Cape San Lucas, Mexico, there is a large pen-shaped second anal spine having a strong median keel. This is lost in our specimen and a single flat blunt spine only is present. Pectoral fin rounded; its length a little less than that of snout. Ventral represented by a single flat spine, inserted a little behind base of pectoral; its length equal to that of anterior canine. Caudal wide; its posterior edge lunate.

Color dark brown, everywhere speckled with small irregular spots of black; head a little darker than trunk; lateral line a little darker than surrounding color. Dorsal light at base, growing dark toward tips of rays; anal more uniformly dusky; caudal black; pectoral dusky toward tip. Inside of gill cover, mouth, and body cavity coal black. Here described from a specimen 30 inches in length collected by Dr. C. F. Holder, at Catalina Island.

It was previously known from two very small specimens taken at Cape San Lucas—the one by John Xantus, the other by Richard C. McGregor.

Family XIPHIIDÆ.

XIPHIAS GLADIUS Linnæus.

The swordfish is occasionally taken about Santa Catalina. It has been seen by the writers off Santa Barbara, Santa Catalina, and San Diego.

Family ISTIOPHORIDÆ.

TETRAPTURUS MITSUKURII Jordan and Snyder.

MARLIN-SPIKE FISH.

This species, not rare in Japan, is occasionally taken off Santa Catalina, where it is known as marlin-spike fish. A specimen taken August 17, 1904, 8 feet, 8 inches long, weighed 120 pounds. Another 12 feet long is on record.



FIG. 5.—TETRAPTURUS MITSUKURII.

Family CARANGIDÆ.

NAUCRATES DUCTOR Linnæus.

One specimen of this oceanic species was obtained. We are unable to separate it from the pilot fish of the Atlantic. A specimen from Misaki, Japan, in Stanford University, is apparently also referable to *Naucrates ductor*. We have seen no Pacific specimens as deep in body or as large scaled as *Naucrates polyarcus*, lately described from the west coast of Mexico by Mr. Henry W. Fowler.

Family LUVARIDÆ.

LUVARUS IMPERIALIS Rafinesque.

A specimen of this widely diffused oceanic fish was taken at Avalon by Doctor Holder.

Family POMACENTRIDÆ.

CHROMIS PUMCTIPINNIS (Cooper).

This species, very abundant about Santa Catalina, is, in life, of a milky sky blue.

Family BALISTIDÆ.

BALISTES CASTANEUS Richardson.

(*Balistes polylepis* Steindachner.)

A specimen of this species was seen in the aquarium at Avalon. We have also an example taken at Santa Catalina by Mr. T. Shooter.

Family PLEURONECTIDÆ.

CITHARICHTHYS STIGMÆUS Jordan and Gilbert.

This little flounder, otherwise rare, is common on the sands of Avalon Bay.

Family REGALECIDÆ.

REGALECUS RUSSELLI (Shaw).

A specimen of oar-fish has been taken at Newport, Orange County (February 22, 1901). It was 22 feet in length and weighed 500 to 600 pounds. Others, old and young, have been taken about Avalon, but none have been preserved. An account of these is given by Jordan.^a Doctor Holder thus speaks of a specimen 2 feet long taken at Avalon. "Its topknot (it can be compared to nothing else) was a vivid red or scarlet mass of seeming plumes. These dorsal plumes merged into a long dorsal fin extending to the tail. The color of the body was a

^aGuide to the Study of Fishes, II, p. 474.

brilliant silver sheen, splashed with equally vivid zebra-like stripes, which gave the fish a most striking appearance. The fish was a fragile and delicate creature, a very ghost of a fish, which swam along, when the water gently lapped the sands, with an undulatory motion, looking like one of its names—the ribbon-fish."

Family BLENNIDÆ.

STARXSIA HOLDERI Lauderbach, new species.

Head $3\frac{1}{2}$ in length to base of caudal; depth 5; eye 4 in head; snout 3; maxillary $2\frac{1}{4}$; dorsal XXV, 11; anal II, 23; scales 51.

Maxillary extending back to below posterior edge of pupil. Jaws even in front; the lips rather thick. An outer series of rather large blunt teeth on sides and front of jaws, the anterior ones slightly the larger; behind these a band of villiform teeth wide in front but tapering quickly to a point at sides of jaws; the band wider and extending a little farther back on upper jaw than on lower; a band of similar teeth on vomer, and a rather large ovate patch on front of each palatine, not continuous with vomerine patch. A fringed tentacle on

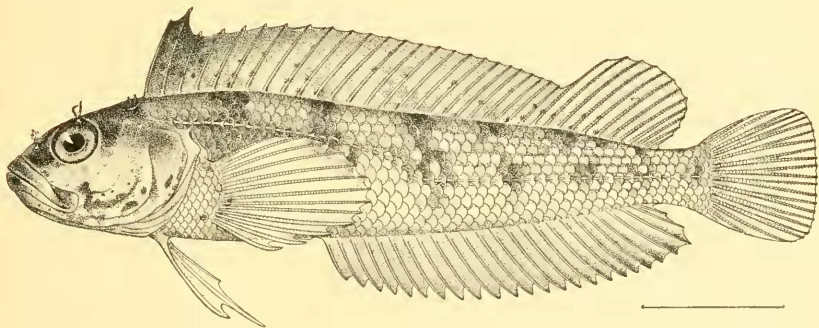


FIG. 6.—*STARXSIA HOLDERI*.

anterior nostril; a pair of simple filaments above each eye, each pair springing from a common base; their length equal to diameter of pupil; a shorter trifold flap at nape, its separate filaments united only at base. Interorbital space flat; its width equal to one-half diameter of eye. Top of head with rather large conspicuous pores. Inner edge of shoulder girdle with a sharp ridge ending abruptly opposite upper end of pectoral base and forming a slight notch, but no hook present. Gill membrane broadly united, free from isthmus.

Head and fins naked; rather large cycloid scales on body; two scales between middle of lateral line arch and outline of back; five scales between posterior angle of lateral line and ventral outline of body; arched part of lateral line scarcely shorter than straight part.

Second dorsal spine the longest, its length equal to postorbital part of head; behind the second spine the outline of the fin is concave; the

spines increasing in length to middle of spinous portion; the longest middle spines contained $2\frac{1}{2}$ in head; the spines next to soft dorsal are half the length of anterior soft rays which are a little longer than the second spine. Anal low; its posterior rays the longest; their length $2\frac{1}{4}$ in head; anal spines differentiated from anal rays only by the absence of cross articulations. Lower pectoral rays slightly thickened. Ventral with one spine and 2 rays; the inner ray the longer, nearly reaching to vent; its length equal to length of head without snout. Caudal truncate.

Color in spirits light gray, with 7 slightly darker inconspicuous crossbars half as wide as eye; dark lines following the rows of scales side of head slightly mottled with slate color; a slate-colored blotch at tip of mandible and indications of bars on lower side of head of similar color. Spinous dorsal dark in front growing light backwards; anal dusky; the tips of the rays lighter; pectoral dusky at base; caudal slightly soiled with dusky.

The type and sole specimen is 94 mm. in length and is Cat. No. 56397, U.S.N.M.

This species is named for Dr. Charles Frederick Holder. It is referred provisionally to the genus *Starksia*. From the type of that genus, *Starksia crennobates*, it differs in the presence of nuchal filaments, in the smaller scales, and in larger numbers of fin rays. It may prove to be the type of a distinct genus.

CHÆNOPSIS ALEPIDOTA (Gilbert).

(*Lucioblennius alepidotus* Gilbert).

The following description is of three specimens, two of them males, from Avalon Bay, from 125 to 165 mm. in length.

Head $3\frac{1}{5}$ in length. Depth $3\frac{1}{2}$ in. head; eye $7\frac{1}{2}$ to $8\frac{1}{2}$; snout $4\frac{1}{2}$ to 5, maxillary $1\frac{3}{4}$. Dorsal XIX or XX, 36 to 38; anal II, 37 or 38.

Head very pike-like; the lower jaw thin and projecting, the snout sharp and its outline straight from eyes to its point, as viewed from the side; as viewed from above it is rather broad and rounded in front. Maxillary long, reaching far past eye, its upper edge behind eye slipping under a dermal sheath. A row of even enlarged teeth in jaws and a band of villiform teeth behind them in front; a single row of rather large blunt teeth on palatine and a few very small teeth on vomer. The latter are scarcely to be seen until the jaws are dried. Interorbital space narrow, its width half diameter of eye.

Dorsal commencing at nape, running continuous to caudal; its last ray joined to base of caudal by membrane. Dorsal spines distinguished from soft rays by being more slender and lacking cross articulations; none of the rays branched. In the female the spines are no higher than the rays; the longest equal to the length of the snout. In the male the spines and the membrane between them are greatly elevated and are from one and one-half to two times greater than the depth of

the body. The slender spines and thin, soft membranes of the dorsal resemble in texture the pectoral fins of *Cephalacanthus*. Anal a very little lower than the dorsal and posteriorly connected with the caudal. Caudal rather short and broadly rounded, without an angle at tips of outer rays. Pectoral rounded, its rays simple; its length from $2\frac{1}{3}$ to $2\frac{1}{2}$ in head; ventral with one spine and three rays; the middle ray the longest, as long as distance from tip of snout to middle of eye or sometimes a little longer; the first ray somewhat shorter, and the third ray very slender and closely attached to the second ray which is fully three times longer; it is inconspicuous and might easily be overlooked.

Color in spirits, light grayish brown, with eleven dark brown short crossbars or blotches on the middle of the side fading out above and below; some of the anterior blotches more or less separated into two spots; sides with or without small round light spots, irregular in size and bordered with dusky color slightly darker than the surrounding color, small dusky spots of irregular size on top of head and smaller sharper dark spots along back (these only conspicuous on the largest specimen). Ventral fins and branchiostegal membrane of female slightly

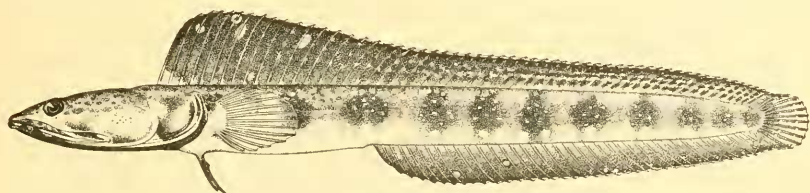


FIG. 7.—CHLENOPSIS ALEPIDOTA.

dusky; those of male, coal black, with bluish reflections; pectoral slightly dusky in both sexes. Spinous dorsal of female light with a few dusky bands across the rays; soft dorsal similarly marked, but the cross lines more numerous and closer together; the color fading out posteriorly and the fin nearly colorless; a small black spot ocellated with a light ring between the first and second spines; anal and caudal colorless. Spinous dorsal of male coal black; soft dorsal growing black toward outer edge, with a narrow border of colorless membrane and rather thickly covered with small round light spots; caudal dusky with similar spots; anal growing black toward ends of rays like the soft dorsal, but unspotted.

The following notes are by Miss Lauderbach, from whom the specimens were obtained:

The largest specimen was caught from the end of the wharf at Avalon with hook and line. When in the aquarium it snapped viciously at every approaching hand. In swimming the body was flexible and eel-like. A favorite movement was to squirm backward into small crevices between the rocks, leaving only the mouth at the entrance. It repeatedly jumped from the tank.

One of the 2 typical specimens of *Lucioblennius alopidotus* from Guaymas, Mexico (No. 72 Stanford University), has the dorsal XX, 35 and the anal II, 35, as shown in the drawing published by Jordan.^a

The genus *Lucioblennius* Gilbert, based on a young specimen of this species, is doubtless inseparable from *Chænopsis*.

Family ANTENNARIID.E.

ANTENNARIUS AVALONIS Jordan and Starks, new species.

Dorsal iii-12; anal 8. Depth 2 in length to base of caudal. Eye 2 in space from eye to base of second dorsal spine; 2 in preorbital space without premaxillary. Maxillary $3\frac{1}{2}$ in length. Upper jaw vertical. Teeth slender, sharp, and slightly recurved; in broad bands on jaws; similar teeth on vomer and palatines; on the former in 2 ovate

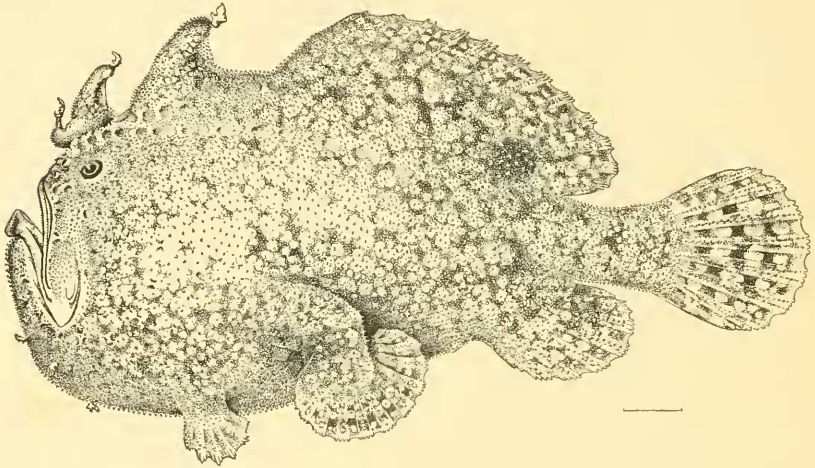


FIG. 8.—ANTENNARIUS AVALONIS.

patches separated at the median line; in a single short, irregular row on each palatine. A conspicuous knob at symphysis.

First dorsal spine broken; second spine not hooked at the tip, ending in a fleshy tentacle; length of spine equal to distance from its base to lower edge of eye; no pit behind it; third dorsal spine much longer and stronger than second, scarcely diminishing in size from its base to its tip, ending in a fleshy flap of skin; it is rather freely movable, but moderately bound to the body for its full length by skin; between its tip and outline of back the skin is concave; pectoral very thick, the lower surface with plicate ridges and short, thick papillæ.

Skin covered with rather coarse bifurcate spines; second and third dorsal spines closely covered with simple and bifurcate spines, and similar spines follow the fin rays nearly to their tips; premaxillary

^aProc. Cal. Acad., 2d ser., VI, pl. XXXVII; not dorsal XVIII, 32 and anal II, 30 as originally described.

naked upper end, and a patch down middle of maxillary with spines, lower end, anterior margin and an area behind maxillary naked; a wide area on each side of the mandible naked; a saddle-like patch behind second dorsal spine naked; lines of spinous tubercles surrounded by small naked areas most conspicuous at base of second dorsal spine; a few following edge of preopercle and side of body; three or four scattered over cheek and maxillary; a few large fleshy flaps on mandible and lower part of head.

Body, head, and fins irregularly mottled with a network of dark and light-brown lines around spots of white; dark, very irregular bars on caudal, more broken and less evident on other fins, though no lighter; an irregular spot at base of last dorsal rays irregularly and inconspicuously ocellated; inside of mouth light brown.

The type is $13\frac{1}{2}$ inches in length, and is numbered 9979 in the Stanford University collections. A specimen obtained previously at Avalon was lost or destroyed.

This species differs from *Antennarius strigatus* in color; there being no stripes or bars apparent anywhere; and the third dorsal spine is considerably free, not developed as a hump. A specimen of *A. strigatus* from Panama (possibly referable to another species), 10 inches long, is described as being covered with fine shagreen-like armature. The armature of *A. aralonis* could scarcely be called fine or shagreen-like. The species differs from *Antennarius tagus* Heller and Snodgrass, in having no deep pit behind second dorsal spine; the tip of second spine not strongly bent backward, but ending in a fleshy flap; the naked areas on sides of mandible larger; in having short fleshy tentacles under mandible; in having the fins thicker, lower, and the underside of pectorals plicate and papillose. The color is darker than in *A. tagus* and of a different pattern.